

Response under 37 C.F.R. §1.111

Attorney Docket No. 980446

Serial No. 09/050,113

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of the Claims:

Claim 1 (Previously Presented): A semiconductor device comprising:

a base substrate;

a first conducting film formed over the base substrate and including two conductor patterns adjacent to each other;

an etching stopper film covering each upper surface of the two conductor patterns;

a first insulation film formed over the etching stopper film and the base substrate;

a contact hole, located between the two conductor patterns, reaching the base substrate through the first insulation film, wherein an end of the contact hole is positioned on the etching stopper film; and

a sidewall insulation film, formed on an inner wall of the first insulation film, each side wall of the two conductor patterns, and each side wall of the etching stopper film in the contact hole,

wherein each of said etching stopper films is completely covered by said first insulation film and said respective sidewall insulation film.

Claim 2 (Currently Amended): A semiconductor device comprising:

a base substrate;

a first conducting film formed over the base substrate and including a plurality of conductor patterns adjacent to each other;

an etching stopper film covering an upper surface of the conductor patterns;

a contact hole located in a part of a region between the adjacent conductor patterns and having an end thereof defined by the conductor patterns;

a first insulation film formed on a remaining part of the region between the adjacent conductor patterns, the first insulation film filling spaces between the adjacent conductor patterns, not extending over the etching stopper film, the first insulation film being in contact with side walls of the conductor patterns; and

a sidewall insulation film formed on an inner wall of the contact hole ~~and surrounding the contact hole~~, the sidewall insulation film covering the side walls of the first insulation film, the conductor pattern and the etching stopper film in the contact hole.

Claim 3 (Original): A semiconductor device according to claim 2, wherein
a plurality of the contact holes are formed adjacent to each other with the conductor patterns therebetween.

Claim 4 (Original): A semiconductor device according to claim 1, further comprising:
a second insulation film having a lower dielectric constant than the etching stopper film between the first conducting film and the etching stopper film.

Claim 5 (Original): A semiconductor device according to claim 2, further comprising:
a second insulation film having a lower dielectric constant than the etching stopper film between the first conducting film and the etching stopper film.

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Claim 6 (Original): A semiconductor device according to claim 5, wherein
the etching stopper film is formed of conducting film.

Claim 7 (Original): A semiconductor device according to claim 6, further comprising:
a second conducting film formed on the first insulation film and connected to the base
substrate in the contact hole, and wherein
the etching stopper film is formed only in a region where the first conducting film
intersects the second conducting film.

Claim 8 (Original): A semiconductor device according to claim 2, wherein
the sidewall insulation film is formed of a material having etching characteristics
substantially equal to those of the etching stopper film, and formed an entire region of the side
walls of the first conducting film and the etching stopper film.

Claims 9 – 11 (Canceled).

Claim 12 (Previously Presented): A semiconductor devise comprising:
a semiconductor substrate;
a plurality of word lines formed on the semiconductor substrate and extended in a first
direction;
a first insulation film formed on the word lines and the semiconductor substrate;
a plurality of bit lines formed on the first insulation film and extended in a second
direction;

an etching stopper film covering upper surfaces of the bit lines;

a contact hole located in a part of a region between the adjacent bit lines, having ends thereof defined by the bit lines;

a second insulation film which is filling space between said plurality of bit lines where the contact hole is not formed and not exceeding over the etching stopper film;

a sidewall insulation film, formed in the contact hole, covering a side wall of the second insulation film, side walls of the bit lines and side walls of the etching stopper film; and

a capacitor having one electrode connected to the semiconductor substrate through the contact hole.

Claim 13 (Canceled).

Claim 14 (Original): A semiconductor device according to claim 12, wherein said one electrode of the capacitor is connected to the semiconductor substrate through a plug buried in the first insulation film.

Claim 15 (Withdrawn): A method for fabricating a semiconductor device comprising:
a first conducting film forming step of forming on a base substrate a first conducting film including a plurality of conductor patterns adjacent to each other, and having a upper surface thereof covered with an etching stopper film;
a first insulation film forming step of forming a first insulation film buried between said a plurality of conductor patterns;

a contact hole forming steps of etching the first insulation film with the etching stopper film as a mask to form a contact hole which reaches the base substrate between the conductor patterns and an end of which is defined by the conductor patterns; and

a sidewall insulation film forming steps of forming a sidewall insulation film on side walls of the first conducting film and the etching stopper film in the contact hole.

Claim 16 (Withdrawn): A method for fabricating a semiconductor device according to claim 15, wherein

in the contact hole forming step the first insulation film is etched with a photoresist having an opening extended over said a plurality of conductor patterns and the etching stopper film as a mask to form a plurality of the contact holes in the opening.

Claim 17 (Withdrawn): A method for fabricating a semiconductor device according to claim 15, further comprising before the first conducting film forming step,

a device isolation film forming step of forming a device isolation film buried in the base substrate.

Claim 18 (Withdrawn): A method for fabricating a semiconductor device according to claim 16, further comprising before the first conducting film form step,

a device isolation film forming step of forming a device isolation film buried in the base substrate.

Claim 19 (Withdrawn): A method for fabricating a semiconductor device comprising:

a word line forming step of forming on a semiconductor substrate a plurality of word lines extended in a first direction of having upper surfaces thereof covered with an etching stopper film;

a first insulation film forming step of forming a first insulation film on the etching stopper film and the semiconductor substrate;

a contact hold forming step of forming in the first insulation film a contact hole which reaches the semiconductor substrate between the word lines, and an end of which is positioned on the etching stopper film on the word lines;

a sidewall insulation film forming step of forming a sidewall insulation film on side walls of the word lines and of the etching stopper film in the contact hole; and

a bit line forming step of forming on the first insulation film a plurality of bit lines extended in a second direction which intersects the first direction and connected to the semiconductor substrate through the contact hole.

Claim 20 (Withdrawn): A method for fabricating a semiconductor device comprising:

a word line forming step of forming on a semiconductor substrate a plurality of word lines extended in a first direction of having upper surfaces thereof covered with an etching stopper film;

a first insulation film forming step of forming a first insulation film buried between the word lines;

a contact hole forming step of etching the first insulation film with the etching stopper film as a mask to form a contact hole which reaches the semiconductor substrate between the word lines and an end of which is defined by the word lines;

a sidewall insulation film forming step of forming a sidewall insulation film on side walls of the word lines and the etching stopper film in the contact hole; and

a bit line forming step of forming on the first insulation film a plurality of bit lines extended in a second direction which intersects the first direction and connected to the semiconductor substrate through the contact hole.

Claim 21 (Withdrawn): A method for fabricating a semiconductor device comprising:

a word line forming step of forming on a semiconductor substrate a plurality of word lines extended in a first direction and having upper surfaces thereof covered with an etching stopper film;

a sidewall insulation film forming step of forming sidewall insulation film having etching characteristics substantially equal to those of the etching stopper film on side walls of the word lines and of the etching stopper film;

a first insulation film forming step of forming a first insulation film buried between the word lines with the sidewall insulation film formed on;

a contact hole forming step of etching the first insulation film with the etching stopper film and the sidewall insulation film as a mask to form a contact hole which reaches the semiconductor substrate between the word lines and an end of which is defined by the sidewall insulation film; and

a bit line forming step of forming on the first insulation film a plurality of bit lines extended in a second direction which intersects the first direction and connected to the semiconductor substrate through the contact hole.

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Claim 22 (Previously Presented): A method for fabricating the semiconductor device according to claim 20, wherein

in the contact hole forming step, the first insulation film is etched with a photoresist including an opening extended over the word lines, and the etching stopper film as a mask to form a plurality of the contact holes in the opening.

Claim 23 (Previously Presented): A method for fabricating the semiconductor device according to claim 21, wherein

in the contact hole forming step, the first insulation film is etched with a photoresist including an opening extended over the word lines, and the etching stopper film as a mask to form a plurality of the contact holes in the opening.

Claim 24 (Previously Presented): A method for fabricating the semiconductor device according to claim 19, further comprising before the bit line forming step, a plug forming step of forming a plug buried in the contact hole.

Claim 25 (Previously Presented): A method for fabricating the semiconductor device according to claim 20, further comprising before the bit line forming step, a plug forming step of forming a plug buried in the contact hole.

Claim 26 (Previously Presented): A method for fabricating the semiconductor device according to claim 21, further comprising before the bit line forming step, a plug forming step of forming a plug buried in the contact hole.

Claim 27 (Withdrawn): A method for fabricating a semiconductor device comprising:

 a word line forming step of forming on a semiconductor substrate a plurality of word lines extended in a first direction;

 a first insulation film forming step of forming a first insulation film on the semiconductor substrate with the work lines formed on;

 a bit line forming step of forming on the first insulation film a plurality of bit lines extended in a second direction which intersects the first direction and having upper surfaces thereof covered with an etching stopper film;

 a second insulation film forming step of forming a second insulation film on the etching stopper film and the first insulation film;

 a contact hole forming step forming in the second insulation film a contact hole which is formed between the bit lines and an end of which is positioned on the etching stopper film on the bit lines;

 a sidewall insulation film forming step of forming a sidewall insulation film on side walls of the bit lines and of the etching stopper film in the contact hole; and

 a capacitor forming step of forming on the second insulation film a capacitor having one electrode connected to the semiconductor substrate through the contact hole.

Claim 28 (Withdrawn): A method for fabricating a semiconductor device comprising:

 a word line forming step of forming on a semiconductor substrate a plurality of word lines extended in a first direction;

a first insulation film forming step of forming a first insulation film on the semiconductor substrate with the word lines formed on;

a bit line forming step of forming on the first insulation film a plurality of bit lines extended in a second direction which intersects the first direction and having upper surface thereof covered with an etching stopper film;

a second insulation film forming step of forming a second insulation film buried between the bit lines;

a contact hole forming step of etching the second insulation film with the etching stopper film as a mask to form a contact hole which is formed on between the bit lines and an end of which is defined by the bit lines;

a sidewall insulation film forming step of forming a sidewall insulation film on side walls of the bit lines and of the etching stopper film in the contact hole; and

a capacitor forming step of forming on the second insulation film a capacitor having one electrode connected to the semiconductor substrate through the contact hole.

Claim 29 (Withdrawn): A method for fabricating a semiconductor device according to claim 27, wherein

in contact hole forming step, the second insulation film is etched with a photoresist having a pattern which alternately covers a region between the word lines, and the etching stopper film as a mask to form a plurality of the contact holes.

Claim 30 (Withdrawn): A method for fabricating a semiconductor device according to claim 28, wherein

in contact hole forming step, the second insulation film is etched with a photoresist having a pattern which alternately covers a region between the word lines, and the etching stopper film as a mask to form a plurality of the contact holes.

Claim 31 (Withdrawn): A method for fabricating a semiconductor device according to claim 27, wherein

in the contact hole forming step, the first insulation film and the second insulation film are etched to form a contact hole which reaches the semiconductor substrate and an end of which is defined by the bit lines and the word lines.

Claim 32 (Withdrawn): A method for fabricating a semiconductor device according to claim 28, wherein

in the contact hole forming step, the first insulation film and the second insulation film are etched to form a contact hole which reaches the semiconductor substrate and an end of which is defined by the bit lines and the word lines.

Claim 33 (Withdrawn): A method for fabricating a semiconductor device according to claim 27, wherein

in the bit line forming step, the etching stopper film is formed of a conductor; and

in the capacitor forming step the etching stopper film is processed in the same pattern as said one electrode of the capacitor.

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Claim 34 (Withdrawn): A method for fabricating a semiconductor device according to claim 28, wherein

in the bit line forming step, the etching stopper film is formed of a conductor; and

in the capacitor forming step the etching stopper film is processed in the same pattern as said one electrode of the capacitor.

Claims 35 – 37(Canceled).